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(54) [Title] PAY-BROADCAST RECEPTION DEVICE, PAY-BROADCAST RECEPTION METHOD, PAY-BROADCAST TRANSMISSION/RECEPTION DEVICE, AND PAY-BROADCAST TRANSMISSION/RECEPTION METHOD

(57) Abstract

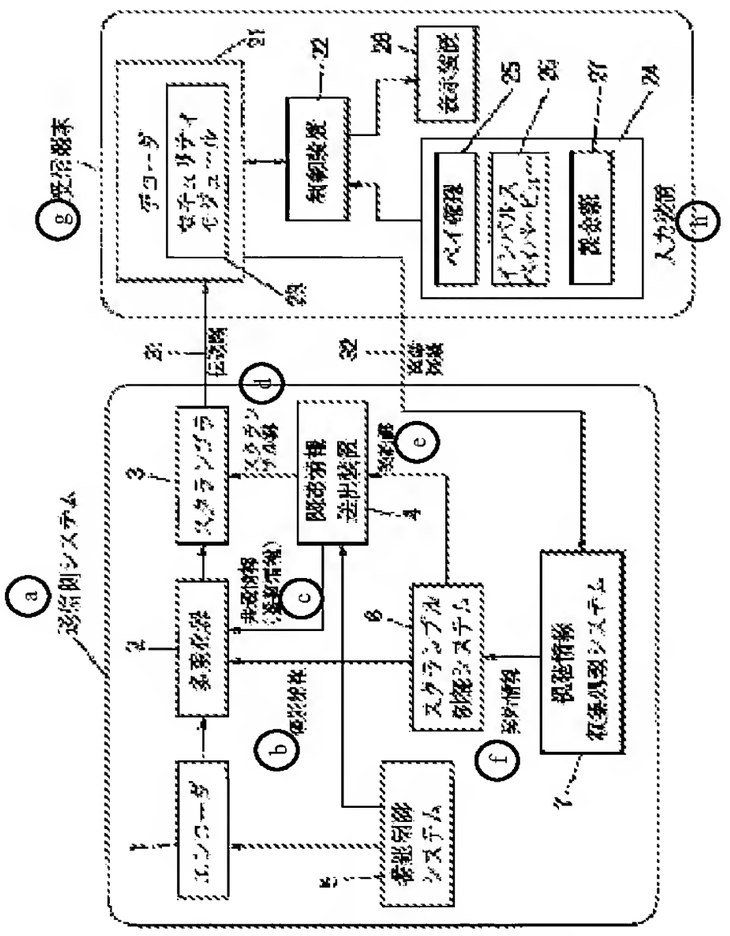
Abstract

Problem

Before starting to watch a pay-per-view program of pay-broadcasting, a charge applicable to said program is displayed, and the total charge incurred thus far since a specific date is also displayed..

Solution

A transmitting-side system transmits a program together with a charge applicable to said program, and said monetary amount is displayed on display unit 28 at a receiving terminal. Titles of and charges for purchased programs are stored in security module 23, and the total amount is displayed on display unit 28 as so instructed by a viewer.



Key:

a	Transmitting-side system
b	Private information
c	Common information (program information)
d	Subscription information
e	Scrambling key
f	Subscription key
g	Reception terminal
h	Input unit
1	Encoder
2	Multiplexer
3	Scrambler
4	Related information sending unit
5	Program control system
6	Scrambling control system
7	Viewing information collection processing system
21	Decoder
22	Controller
23	Security module
25	Pay acknowledgement
26	Impulse pay-per-view
27	Charge amount
28	Display unit
31	Transmission channel
32	Telephone line

Claims

1. A pay-broadcast reception device that receives a program transmitted from a broadcast-supply side along with information concerning a usage fee for said program and applies a usage fee according to the information concerning the aforementioned program used by a viewer, wherein

the pay-broadcast reception device is characterized by being equipped with a reception means that receives the aforementioned program sent from the aforementioned broadcast-supply side,

an extraction means that extracts the aforementioned information concerning the usage fee from the aforementioned program received by the aforementioned reception means, and

a display means that displays the aforementioned information concerning the usage fee extracted by the aforementioned extraction means.

2. A pay-broadcast reception device that receives a program transmitted from a broadcast-supply side along with information concerning a usage fee for said program and applies a usage fee according to the information concerning the aforementioned program used by a viewer, wherein

the pay-broadcast reception device is characterized by being equipped with a reception means that receives the aforementioned program sent from the aforementioned broadcast-supply side,

an extraction means that extracts the aforementioned information concerning the usage fee from the aforementioned program received by the aforementioned reception means,

an input means that inputs use of the aforementioned program by the viewer,

a memory means that stores information concerning the aforementioned usage fee extracted by the aforementioned extraction means when use of the aforementioned program is input from the aforementioned input means,

a calculation means that calculates the total of the aforementioned usage fees stored in the aforementioned memory means during a specific period, and

a display means that displays the total usage fee obtained by the aforementioned calculation means.

3. A pay-broadcast reception method with which a program transmitted from a broadcast-supply side and information concerning a usage fee for said program are received by a viewer-side pay-broadcast reception device, and a usage fee is applied according to the information concerning the aforementioned program used by the viewer, wherein the pay-broadcast reception method is characterized in that

the aforementioned program sent from the aforementioned broadcast-supply side is received,

the aforementioned information concerning the usage fee is extracted from the aforementioned received program, and

the aforementioned information concerning the usage fee is displayed.

4. A pay-broadcast reception method with which a program transmitted from a broadcast-supply side and information concerning a usage fee for said program are received by a viewer-side pay-broadcast reception device, and a usage fee is applied according to the information concerning the aforementioned program used by the viewer, wherein the pay-broadcast reception method is characterized in that

the aforementioned program sent from the aforementioned broadcast-supply side is received,

the aforementioned information concerning the usage fee is extracted from the aforementioned received program,

the aforementioned information concerning the usage fee is stored when use of the aforementioned program by the viewer is input,

the aforementioned usage fees stored during a specific period are totaled, and

the total fee is displayed.

5. A pay-broadcast transmission/reception device that receives a program transmitted from a broadcast-supply side at a viewer-side reception terminal and applies a usage fee according to information concerning the aforementioned program used at the aforementioned reception terminal, wherein the pay-broadcast transmission/reception device is characterized in that

the aforementioned broadcast-supply side is equipped with

an adder means that adds the aforementioned information concerning the usage fee for the aforementioned program to the aforementioned program and

a transmission means that transmits the aforementioned program to the reception terminal; and

the aforementioned reception terminal is equipped with

a reception means that receives the aforementioned program sent from the aforementioned broadcast-supply side,

an extraction means that extracts the aforementioned information concerning the usage fee from the aforementioned program received by the aforementioned reception means, and

a display means that displays the aforementioned information concerning the usage fee extracted by the aforementioned extraction means.

6. A pay-broadcast transmission/reception device that receives a program transmitted from a broadcast-supply side at a viewer-side reception terminal and applies a usage fee according to information concerning the aforementioned program used at the aforementioned

reception terminal, wherein the pay-broadcast transmission/reception device is characterized in that

the aforementioned broadcast-supply side is equipped with

an adder means that adds the aforementioned information concerning the usage fee for the aforementioned program to the aforementioned program and

a transmission means that transmits the aforementioned program to the reception terminal; and

the aforementioned reception terminal is equipped with

a reception means that receives the aforementioned program sent from the aforementioned broadcast-supply side,

an extraction means that extracts the aforementioned information concerning the usage fee from the aforementioned program received by the aforementioned reception means,

an input means that inputs use of the aforementioned program by the viewer,

a memory means that stores information concerning the aforementioned usage fee extracted by the aforementioned extraction means when use of the aforementioned program is input from the aforementioned input means,

a calculation means that calculates the total of the aforementioned usage fees stored in the aforementioned memory means during a specific period, and

a display means that displays the total usage fee obtained by the aforementioned calculation means.

Detailed explanation of the invention

[0001]

Technical field of the invention

The present invention pertains to a pay-broadcast reception device, a pay-broadcast reception method, a pay-broadcast transmission/reception device, and a pay-broadcast transmission/reception method, and in particular to a pay-broadcast reception device, a pay-broadcast reception method, a pay-broadcast transmission/reception device, and a pay-broadcast transmission/reception method that are suitable for use in a pay-broadcast transmission/reception device that applies a charge according to information used by a viewer.

[0002]

Prior art

In recent years, video/audio compression methods have been established based on MPEG2 (Moving Picture Experts Groups Phase 2), for example, and digitized video/audio can

now be transmitted using lower bit rates. As a result, a larger amount of information can be transmitted using an existing transmission channel.

[0003]

Due to this trend, pay-broadcasting systems increasingly utilize multichannels (Multichannel) and multimedia (Multimedia), which offer more program (information) options to viewers (users of information).

[0004]

Roughly speaking, pay-broadcast systems offer 2 forms of viewing: that is,

(a) Flat (Flat) subscriptions where an agreement is signed per each channel and

(b) Pay-per-view (Pay per view) where a fee is paid according to the program viewed.

In addition, the pay-per-view comes in 2 forms: that is,

(b-1) Call ahead pay-per-view (Call Ahead Pay per view) subscriptions where viewing of a program is notified to the sender in advance and

(b-2) Impulse pay-per-view (Impulse Pay per view) subscriptions where viewing of a program does not have to be notified to the sender.

[0005]

Even if the amount of information received by viewers has increased as mentioned above, viewers do not necessarily utilize all of the information. Thus, as the amount of information received by viewers increases, the amount of unused information also increases. From this viewpoint, pay-per-view, that is, a viewing fee billed only for information used, can be considered as a charging method that fits said reality.

[0006]

Problems to be solved by the invention

However, in the case of the aforementioned pay-per-view, because charges are collected for a specific period (usually approximately a 1-month period), and conventional broadcasting systems have no means to present charges clearly, a problem occurs in that the viewers cannot determine their total monthly charges until they receive their bills.

[0007]

Furthermore, especially when programs are to be watched by means of impulse pay-per-view, viewers often decide to watch certain programs on the spot (instantaneously). In addition, as described above, because conventional broadcasting systems have no means to clearly present

charges, the viewers must make their viewing decisions without knowing the charges for programs.

[0008]

The present invention was devised in light of said situation in order to inform the charges incurred since a specific date (first day of a billing period) to the viewers and to inform the fees applicable to pay-per-view (especially, impulse pay-per-view) programs to viewers.

[0009]

Means to solve the problems

The pay-broadcast reception device described in Claim 1 is a pay-broadcast reception device that receives a program transmitted from a broadcast-supply side along with information concerning a usage fee for said program and applies a usage fee according to the information concerning the program used by a viewer characterized by being equipped with a reception means that receives the program sent from the broadcast-supply side, an extraction means that extracts the information concerning the usage fee from the program received by the reception means, and a display means that displays the information concerning the usage fee extracted by the extraction means.

[0010]

The pay-broadcast reception device described in Claim 2 is a pay-broadcast reception device that receives a program transmitted from a broadcast-supply side along with information concerning a usage fee for said program and applies a usage fee according to the information concerning the program used by a viewer characterized by being equipped with a reception means that receives the program sent from the broadcast-supply side, an extraction means that extracts the information concerning the usage fee from the program received by the reception means, an input means that inputs use of the program by the viewer, a memory means that stores information concerning the usage fee extracted by the extraction means when use of the program is input from the input means, a calculation means that calculates the total of the usage fees stored in the memory means during a specific period, and a display means that displays the total usage fee obtained by the calculation means.

[0011]

The pay-broadcast reception method described in Claim 3 is a pay-broadcast reception method with which a program transmitted from a broadcast-supply side and information concerning a usage fee for said program are received by a viewer-side pay-broadcast reception

device, and a usage fee is applied according to the information concerning the program used by the viewer characterized in that the program sent from the broadcast-supply side is received, the information concerning the usage fee is extracted from the received program, and the information concerning the usage fee is displayed.

[0012]

The pay-broadcast reception method described in Claim 4 is a pay-broadcast reception method with which a program transmitted from a broadcast-supply side and information concerning a usage fee for said program are received by a viewer-side pay-broadcast reception device, and a usage fee is applied according to the information concerning the program used by the viewer characterized in that the program sent from the broadcast-supply side is received, the information concerning the usage fee is extracted from the received program, the information concerning the usage fee is stored when use of the program by the viewer is input, the usage fees stored during a specific period are totaled, and the total fee is displayed.

[0013]

The pay-broadcast transmission/reception device described in Claim 5 is a pay-broadcast transmission/reception device that receives a program transmitted from a broadcast-supply side at a viewer-side reception terminal and applies a usage fee according to information concerning the aforementioned program used at the reception terminal characterized in that the broadcast-supply side is equipped with an adder means that adds the information concerning the usage fee for the program to the program and a transmission means that transmits the program to the reception terminal; and the reception terminal is equipped with a reception means that receives the program sent from the broadcast-supply side, an extraction means that extracts the information concerning the usage fee from the program received by the reception means, and a display means that displays the information concerning the usage fee extracted by the extraction means.

[0014]

The pay-broadcast transmission/reception device described in Claim 6 is a pay-broadcast transmission/reception device that receives a program transmitted from a broadcast-supply side at a viewer-side reception terminal and applies a usage fee according to information concerning the program used at the aforementioned reception terminal characterized in that the broadcast-supply side is equipped with an adder means that adds the information concerning the usage fee for the program to the program and a transmission means that transmits the program to the reception terminal; and the reception terminal is equipped with a reception means that receives

the program sent from the broadcast-supply side, an extraction means that extracts the information concerning the usage fee from the program received by the reception means, an input means that inputs use of the program by the viewer, a memory means that stores information concerning the usage fee extracted by the extraction means when use of the program is input from the input means, a calculation means that calculates the total of the usage fees stored in the memory means during a specific period, and a display means that displays the total usage fee obtained by the calculation means.

[0015]

In the pay-broadcast reception device described in Claim 1, the reception means receives the program sent from the broadcast-supply side, the extraction means extracts the information concerning the usage fee from the program received by the reception means, and the display means displays the information concerning the usage fee extracted by the extraction means.

[0016]

In the pay-broadcast reception device described in Claim 2, the reception means receives the program sent from the broadcast-supply side, the extraction means extracts the information concerning the usage fee from the program received by the reception means, the input means inputs use of the program by the viewer, the memory means stores information concerning the usage fee extracted by the extraction means when use of the program is input from the input means, the calculation means calculates the total of the usage fees stored in the memory means during a specific period, and the display means displays the total usage fee obtained by the calculation means.

[0017]

In the pay-broadcast reception method device described in Claim 3, the program sent from the broadcast-supply side is received, the information concerning the usage fee is extracted from the received program, and the information concerning the usage fee is displayed.

[0018]

In the pay-broadcast reception method device described in Claim 4, the program sent from the broadcast-supply side is received, the information concerning the usage fee is extracted from the received program, the information concerning the usage fee is stored when use of the program by the viewer is input, the usage fees stored during a specific period are totaled, and the total fee is displayed.

[0019]

In the pay-broadcast transmission/reception device described in Claim 5, at the broadcast-supply side, the adder means adds the information concerning the usage fee for the program to the program, and the transmission means transmits the program to the reception terminal. On the other hand, at the reception terminal, the reception means receives the program sent from the broadcast-supply side, the extraction means extracts the information concerning the usage fee from the program received by the reception means, and the display means displays the information concerning the usage fee extracted by the extraction means.

[0020]

In the pay-broadcast transmission/reception device described in Claim 6, at the broadcast-supply side, the adder means adds the information concerning the usage fee for the program to the program, and the transmission means transmits the program to the reception terminal. On the other hand, at the reception terminal, the reception means receives the program sent from the broadcast-supply side, the extraction means extracts the information concerning the usage fee from the program received by the reception means, the input means inputs use of the program by the viewer, the memory means stores information concerning the usage fee extracted by the extraction means when use of the program is input from the input means, the calculation means calculates the total of the usage fees stored in the memory means during a specific period, and the display means displays the total usage fee obtained by the calculation means.

[0021]

Embodiment of the invention

Figure 1 is a block diagram showing configuration of an application example of the present invention. Here, this broadcasting system is based on a broadcasting scheme called scrambled broadcasting. This scrambled broadcasting refers to a broadcasting scheme in which the sender side intentionally scrambles an original signal using a specific method, so that the video, audio, and data cannot be utilized normally in the event that the broadcast is received by someone who has not signed an agreement with the broadcasting station.

[0022]

Thus, in this Specification, this system will be explained briefly first. Then, operations of an application example of the present invention based on this system will be explained.

[0023]

First, the configuration of the transmitting-side system will be explained.

[0024]

Encoder 1 of the sender side is configured such that it digitizes and compresses a video signal and an audio signal. Multiplexer 2 (adder means) applies time-division multiplexing to multiple encoder outputs and multiple pieces of related information. Here, assume that the related information comprises "program information" that includes program-related information and a scrambling key for scrambling and "private information" that includes subscription information concerning each subscriber (viewer) (subscription type, such as a flat subscription or a pay-per-view subscription) and a subscription key for decrypting common information.

[0025]

Scrambler 3 (transmission means) is configured such that it selectively scrambles specific output signals from multiplexer 2 using a scrambling key obtained from related information sending unit 4 that will be described later.

[0026]

Scrambling control system 6 is configured such that it supplies the subscription key to related information sending unit 4, encrypts the subscription key using a private key unique to the receiver (will be referred to as a reception terminal hereinafter), and supplies it to multiplexer 2 as a part of the private information.

[0027]

Related information sending unit 4 is configured such that it supplies the scrambling key to scrambler 3 encrypts the scrambling key using the subscription key supplied from scrambling control system 6 and supplies it to multiplexer 2 as a part of the common information (program information).

[0028]

Program control system 5 is configured such that it generates a specific control signal and controls encoder 1 according to a specific program. That is, it controls the methods used for digitization and compression. Also, it generates a program ID for the program being encoded by encoder 1 and a channel ID for the corresponding channel and supplies them to related information sending unit 4. Viewing information collection processing system 7 is configured such that it processes pieces of viewing information (for example, channel IDs (Service_id) that

correspond to programs watched and viewing times) and subscription requests from viewers that are up-linked (uploaded) from many terminals and supplies them to scrambling control system 6 as subscription information.

[0029]

Next, the configuration of the reception terminal will be explained.

[0030]

Decoder 21 (reception means) of the reception terminal is configured such that it utilizes a built-in descrambler to descramble the scrambled signal back to the original signal using a scrambling key supplied from security module 23 (memory means) that will be described later. In addition, it extracts and outputs the private information and the program information that were added to the program.

[0031]

Security module 23 is configured with an IC card, for example, in such a manner that it stores a private key unique to the terminal, retrieves the nonscrambled private information supplied via decoder 21, decodes the private information using the private key in order to extract the subscription key and the subscription information, and stores them. In addition, it retrieves the common information added to the program supplied via decoder 21, decodes the common information using the subscription key in order to extract the scrambling key, and supplies it to decoder 21.

[0032]

In addition, controller 22 (calculation means) is configured with a CPU (Central Processing Unit), a RAM (Random Access Memory), and a ROM (Read Only Memory), for example, whereby it controls the entire reception terminal.

[0033]

Input unit 24 (input means) comprises a remote controller, a keyboard, and a mouse, for example, in order to deliver an instruction from the viewer to controller 22. In addition, this input unit 24 is equipped with pay acknowledgement button 25 for entering a program purchase by the viewer, impulse pay-per-view button 26 for watching a pay-per-view program, and charge amount button 27 for displaying a charge amount, for example.

[0034]

Display unit 28 (display means) comprises a CRT (Cathode Ray Tube) display and an LCD (Liquid Crystal Display), for example, in order to display information input through input device 24 and other information.

[0035]

Next, operations of the system will be explained.

[0036]

First, operations performed when private information is transmitted from the transmitting-side system to the reception terminal will be explained. This private information includes a subscription key number corresponding to a subscription key, the subscription key, a channel ID corresponding to a subscribed channel, and a subscription type, for example. In addition, the private information includes information concerning the ID number of a destination reception terminal also.

[0037]

The subscription key is transmitted together with an 8-bit subscription key number, for example, whereby multiple subscription keys can be used as needed. Assume that a subscribed channel number ID is expressed using a 16-bit Service_id. The subscription type comprises 4 bits, for example, in order to allow a flat viewing subscription, pay-per-view subscription, and a special subscription to be identified.

[0038]

This private information is scrambled at scrambling control system 6 using the private key unique to the destination reception terminal to which this private information should be transmitted. At scrambling control system 6, all private keys unique to respective reception terminals are stored while they are correlated with the ID numbers of the reception terminals, whereby the private key of any destination reception terminal can be retrieved using its ID number. Thus, the private key corresponding to the ID number of the destination reception terminal is retrieved, and the private information is scrambled accordingly. The encrypted private information is supplied to multiplexer 2.

[0039]

At multiplexer 2, the digitized compressed video and audio signals of a specific program supplied from encoder 1 and the private information supplied from scrambling control system 6 are time-division-multiplexed and supplied to scrambler 3.

[0040]

Of the digital signals supplied to scrambler 3, only the program portion (audio data and video data) is scrambled using the scrambling key supplied from related information sending unit 4, and the private information portion is sent out to transmission channel 31 without scrambling.

[0041]

Here, the transmission of this private information to the reception terminal is carried out as needed when the private information is to be updated. This private information contains the aforementioned subscription information.

[0042]

Next, operations to be carried out when a normal program and program information (a constituent of the common information) added to the program are transmitted from the sender side to the reception terminal will be explained.

[0043]

The program information contains a subscription type, a subscription key number representing a number assigned to a subscription key, an encrypted scrambling key, a Service_id equivalent to a channel ID, and a program ID for identifying a program, for example. In addition, the subscription type includes a flag for indicating whether a specific program is a special program.

[0044]

The specific program information configured in the aforementioned manner at related information sending unit 4 is encrypted using the subscription key supplied from scrambling control system 6 before it is supplied to multiplexer 2. At multiplexer 2, the digitized compressed video and audio signals corresponding to the specific program supplied from encoder 1 and the program information supplied from related information sending unit 4 are time-division-multiplexed and supplied to scrambler 3.

[0045]

At scrambler 3, of the digital signals that are obtained by time-division-multiplexing the compressed video and audio signals and the program information constituting the program supplied there, only the program portion is scrambled using the scrambling key supplied from related information sending unit 4, and the program information portion is sent out to transmission channel 31 without scrambling.

[0046]

The specific program and the additional program information are transmitted from the sender side system to the reception terminal in said manner.

[0047]

Next, operations of the reception terminal will be explained.

[0048]

Figure 2 is a diagram for explaining the principle of operations for viewing authorization control. Decoder 21 is configured with descrambler 41, second decoder 42 (extraction means), and first decoder 43.

[0049]

Private information is transmitted to a legitimate subscriber's reception terminal. Once digital signals, which are obtained by time-division-multiplexing the scrambled specific program and the nonscrambled specific private information, are received by the reception terminal from the transmitting-side system via transmission channel 31, digital signals corresponding to the scrambled program are supplied to descrambler 41.

[0050]

On the other hand, for the nonscrambled private information, the reception terminal ID number added to said unencrypted portion and the reception terminal ID number prestored in security module 23 are first compared, and it is supplied to first decoder 43 when they match.

[0051]

The private information supplied to first encoder 43 is decoded using the private key that is unique to the reception terminal and that is stored in security module 23, and the retrieved subscription key and subscription information are supplied to security module 23 and stored therein. This subscription key is used for decoding of the program information, which will be

described later. In addition, the subscription information is used to determine whether the received program is a subscribed program.

[0052]

While the viewer is watching the program at the reception terminal, the reception terminal is receiving the scrambled specific program and the program information added to the program that are transmitted via transmission channel 31. Digital signals corresponding to the scrambled specific program are supplied to descrambler 41, and the program information added to the program is supplied to second decoder 42.

[0053]

If the subscription key corresponding to the channel of the specific program has already been extracted from the private information decoded by first decoder 43 and stored in security module 23, second decoder 42 is activated in order to decode the program information using said subscription key supplied from security module 23. The scrambling key contained in the program information is retrieved after the program information has been decoded.

[0054]

Next, the program information is read by security module 23 and checked against the prestored subscription information. If the result is that the program with the added program information is recognized as a subscribed program, the scrambling key obtained by second decoder 42 is supplied to descrambler 41. At descrambler 41, the digital signals of the scrambled specific program are descrambled using the scrambling key supplied from second decoder 42 and restored to the original normal viewable signals before they are output.

[0055]

If flat viewing is subscribed for a specific channel, private information, which contains subscription information comprising a subscription key corresponding to the subscribed channel, a Service_id corresponding to said channel, and the subscription type, is transmitted from the sender side to the reception terminal and stored in security module 23 that constitutes the reception terminal. When many viewing channels are involved, the aforementioned procedure is repeated.

[0056]

In the case of a flat subscription, if the Service_id in the program information added to the received program is already stored in security module 23, the subscription key indicated by

the subscription key number in the program information is already stored in security module 23, and the subscription type corresponding to the Service-id is a flat subscription, the program information is decoded by second decoder 42, the obtained scrambling key is supplied to descrambler 41, and descrambler 41 is activated. As a result, descrambled normal video and audio for the specific program are obtained, and said program becomes viewable.

[0057]

In addition, in the case of a call ahead pay-per-view subscription, the viewer first notifies the sender side that he/she has a program he/she wants to watch from the reception terminal or using means such as a telephone in advance. Next, the sender side transmits a Service_id, a subscription key number, and a subscription key, for example, for the program requested by the viewer to the reception terminal as private information. After this procedure has been completed, the viewer performs an operation such as pressing pay acknowledgement button 25, which means "acknowledgement of payment," of input unit 24 in order to make the desired program available for viewing.

[0058]

Furthermore, in the case of an impulse pay-per-view subscription, the viewer operates impulse pay-per-view button 26 and then performs an operation to specify a desired program using input unit 24. Once said operations are performed, private information, which comprises a subscription key corresponding to said channel, a Service_id corresponding to said channel, and the subscription type, is transmitted immediately from the transmitting-side system to the reception terminal, supplied to security module 23, and stored therein. When many viewing programs are involved, the aforementioned procedure is repeated.

[0059]

As described above, in the case of an impulse pay-per-view subscription, the Service_id in the program information added to the received program and the subscription key indicated by the subscription key number in the program information are stored in security module 23; and the program becomes available for viewing when an operation such as pressing pay acknowledgement button 25 is performed using input unit 24.

[0060]

Viewing history, which comprises a channel ID (Service_id), a program ID (Event-id), a component map (Component_map), a charge (Charge), and viewing time, for example, is stored in security module 23 every time a pay-per-view operation (either a call ahead or an impulse) is

performed. The viewing information stored in security module 23 is transmitted to the transmitting-side system at a specific billing cycle, for example, every month, via telephone line 32. The transmitting-side system processes bills pertaining to respective reception terminals based on the pieces of viewing information transmitted from the reception terminals.

[0061]

The above is an explanation of scrambled broadcasting.

[0062]

Next, operations of an application example of the present invention based on the aforementioned system will be explained.

[0063]

First, processing to be carried out when a charge for a program about to be watched by means of pay-per-view is displayed before the beginning of the program will be explained.

[0064]

Program information (encrypted) reaching the reception terminal via transmission channel 31 is decoded by second decoder 42 into the original program information of the kind shown in Figure 3.

[0065]

As shown in the figure, the program information contains a Service_id that indicates the provider of the program, an Event_id that indicates the name of the program, a Title that indicates the name of the program, and a Charge that indicates the charge for said program, for example.

[0066]

In response to this program information, controller 22 makes display unit 28 display the name of the broadcasting station (name of program provider), the name of the program, and the charge, for example, and waits for an instruction from the viewer.

[0067]

If the viewer decides to watch the target program based on the information displayed on display unit 28, he/she operates pay acknowledgement button 25. As a result of this input, the

aforementioned program information is stored in security module 23, and a viewing history of programs used by this viewer is generated.

[0068]

Figure 4 shows an example of the viewing history stored in security module 23 when pay-per-view has been performed for a specific period of time.

[0069]

As shown in the figure, the program the viewer used (watched) first during this specific period corresponds to "Station A" (stored in the Service_id) as the provider of the program, "Violin recital" (stored in the Title) with the program ID of "0012" (stored in the Event_id), and the resulting charge of "1,000 yen" (stored in the Charge). The viewing history, including subsequent programs up to the last program of "Movie" provided by "Station K" used by this viewer during this specific period, is stored in the manner shown in the figure.

[0070]

Here, although a specific amount such as "1,000 yen" was used for the Charge, data representing said monetary amount may be used instead.

[0071]

Next, operations for totaling the pay-per-view charges incurred during the billing period (from the first day of the billing period to the present) will be explained.

[0072]

In the event of a need to determine pay-per-view charges incurred during a specific period, the viewer presses charge amount button 27 of input unit 24, and the total charge display processing shown in Figure 5 is initiated.

[0073]

In Step S1 in Figure 5, controller 22 reads the first set of data in the viewing history stored in security module 23. Next, in Step S2, it extracts the charge (Charge) from the read data and adds it to the charge previously extracted.

[0074]

Whether all the data in the viewing history have been read is determined in Step S3; and if a decision is made that reading has not been completed, the same processing is repeated upon returning to Step S1.

[0075]

If a decision is made in Step S3 that all the data in the viewing history have been read, advancement is made to Step S4, and the total charge obtained through the processing in Step S2 is displayed on display unit 28 before ending the processing.

[0076]

Figure 6 shows how the total charge obtained through this processing is displayed on display unit 28.

[0077]

As a result, the viewer can determine the total charge for pay programs he/she has watched thus far, whereby if the total amount has exceeded his/her monthly budget, he/she can refrain from watching more pay-per-view programs during the applicable month.

[0078]

Next, processing to be carried out when a component map (Component_map), which indicates an information type, is also added to the program information will be explained.

[0079]

Figure 7 shows program information with a Component_map added. This Component_map comprises 16 bits, for example, and the type of information authorized to the viewer (viewer has already signed an agreement) is expressed by turning the bits ON ("1")/OFF ("0").

[0080]

For example, assume that a specific program contains pieces of information concerning (1) a motion picture, (2) audio (Japanese), (3) data, (4) audio (English), (5) a still image, and (6) a facsimile. Now, assume that a viewer has subscribed to 3 kinds of information, namely, (1) motion pictures, (2) audio, and (3) data. Then, the bits of the Component_map corresponding to said (1) through (3) are turned ON, and this viewer is authorized with respect to these information items.

[0081]

In addition, Charges shown in Figure 7 indicate the changes applied when the respective pieces of information indicated by the Component_map are used.

[0082]

Figure 8 shows a specific example of the program information shown in Figure 7. Here, assume that this viewer has subscribed to motion pictures, audio, and data.

[0083]

The program listed at the beginning of Figure 8 is "Violin recital" presented by "Station A," and it consists of a motion picture and audio. As described above, because this viewer has subscribed to motion pictures, audio, and data, the corresponding bits in the Component_map have all been turned ON ("1").

[0084]

Charges for the respective pieces of information are stored in the Charges. In this case, the motion picture is "1,000 yen," and the audio is "150 yen." In addition, because this program contains only a motion picture and audio, although "data" has been authorized (the bit is set at "1"), no charge for data is stored.

[0085]

The next item "World news" from "Station B" contains a motion picture, audio, and data; and their charges are "500 yen," "200 yen," and "200 yen," respectively.

[0086]

Operations to be performed in the aforementioned configuration when the charges for a program about to be watched are displayed will be explained.

[0087]

Figure 9 is a flow chart for explaining processing for displaying the charges for a program.

[0088]

As shown in the figure, the program information sent from the transmitting-side system is read into controller 22 from decoder 21 in Step S11, and this read program information is displayed on display unit 28 in Step S12.

[0089]

Figure 10 shows how the program information is displayed on display unit 28.

[0090]

Next, the viewer enters an information type to be used using input unit 24 in Step S13. In the example display shown in Figure 10, he/she enters "1" to use only motion picture, "2" to use only audio, or "0" to use both motion picture and audio, for example.

[0091]

Next, upon advancing to Step S14, whether input by the viewer has been completed is determined. If a decision is made that input has not been completed, the process waits for completion of input by the viewer upon returning to Step S13. If a decision is made that input has been completed, advancement is made to Step S15.

[0092]

In Step S15, whether pay acknowledgement button 25 of input unit 24 has been pressed is determined, and the processing is ended if a decision is made that it has not been pressed. Conversely, if a decision is made that it has been pressed, advancement is made to Step S16, and the program information read from decoder 21 in Step S11 is stored in security module 23, and the processing is ended.

[0093]

Figure 11 shows an example of the viewing history stored in security module 23 when pay-per-view has been performed for a specific period of time through the aforementioned series of input operations.

[0094]

In the figure, assume that the Component_map represents pieces of information used by the viewer. For example, if a specific bit is "1," it indicates that the viewer used information corresponding to said bit; and if a specific bit is "0," it indicates that the viewer did not use information corresponding to said bit.

[0095]

As shown in Figure 11, the first information used by the viewer during the specific period is "World news" from "Station B," and the pieces of information used are motion picture and audio. As shown in Figure 8, although this program contains "data" (200 yen) also, because the bit corresponding to "data" in Figure 11 is "0," it is clear that this viewer did not use this information.

[0096]

Similarly, "Baroque concert" from "Station K" stored at the end of the viewing history indicates that only audio was used, and a charge of 200 yen was applied.

[0097]

Next, operations for displaying pay-per-view charges incurred during a specific period (from the first day of the period to the present) will be explained.

[0098]

Figure 12 is a flow chart of processing for displaying the charge (total charge) for pay-per-views during the specific period. This processing is carried out when charge amount button 27 on input unit 24 is operated in the event that the viewer needs to determine the total pay-per-view charge incurred from the first day of the billing period to the present.

[0099]

First, the first viewing information stored in the viewing history is read from security module 23 in Step S21.

[0100]

Next, whether the first bit is elevated ("1") is determined with reference to the Component_map of this viewing information in Step S22. If a decision is made that the bit of the Component_map is not elevated, advancement is made to Step S24 by skipping the next step, that is, Step S23. If a decision is made that it is elevated, advancement is made to Step S23, and the charge corresponding to said bit is obtained with reference to Charges in order to obtain the total charge before advancing to Step S24.

[0101]

For example, in the example shown in Figure 11, because the bit corresponding to "motion picture" in the Component_map is elevated ("1"), the 500 yen applied to this motion picture is added to the total charge. In addition, because the bit for "data" placed at the end of Component_map is not elevated ("0"), this item "data" is ignored.

[0102]

In Step S24, whether reference to all the bits in the Component_map has been completed is determined. If a decision is made that it has not been completed, the same processing is repeated upon returning to Step S22. If a decision is made that it has been completed, advancement is made to Step S25.

[0103]

Whether referencing to all the program information in the viewing history is completed or not is determined in Step S25. If a decision is made that it is not completed, the same processing is repeated upon returning to Step S21. If a decision is made that it is completed, advancement is made to Step S26.

[0104]

The total charge obtained through the aforementioned processing is displayed on display unit 28 in Step S26.

[0105]

Figure 13 shows how the total charge is displayed on display unit 28 in Step S26.

[0106]

The above is an explanation of the processing for displaying pay-per-view charges incurred during a specific period from program information containing a Component_map.

[0107]

Although a case where the total charge incurred from a specific date was displayed when a specific input was made by the viewer was presented in the explanation given above, the total charge may be displayed automatically at the point at which a specific preset amount (for example, 5,000 yen) is exceeded, for example.

[0108]

Also, the total charge incurred from a specific date was displayed in the explanation given above. However, it is also feasible to store the viewing dates when programs were viewed in a program history, and to display the charge for a specific period (for example, up to yesterday from 2 weeks ago) specified by the viewer based on said viewing dates.

[0109]

Furthermore, the aforementioned processing may be carried out when a power switch of the reception terminal is turned ON, or at the point when a viewed program is finished, in order to display the total charge automatically.

[0110]

Moreover, obviously, when the total amount is displayed, not only the amount but also the viewing history (program providers, program names, etc.) may be displayed at the same time.

[0111]

In addition, because the viewer does not always use programs until they are finished, the viewing times of the respective programs may also be recorded in the viewing history, and the charges may be calculated by considering these usage times.

[0112]

Effect of the invention

As described above, according to the pay-broadcast reception device described in Claim 1 and the pay-broadcast reception method described in Claim 4, because the program sent from the broadcast-supply side is received, the information concerning the usage fee is extracted by the extraction means from the program received by the reception means, and the information concerning the usage fee extracted by the extraction means is displayed by the display means, the viewer can determine the charge for a pay-per-view program before he/she starts watching the program.

[0113]

According to the pay-broadcast reception device described in Claim 2 and the pay-broadcast reception method described in Claim 3, because the program sent from the broadcast-supply side is received, the information concerning the usage fee is extracted by the extraction means from the program received by the reception means, use of the program by the viewer is input by the input means, the information concerning the usage fee extracted by the extraction

means is stored by the memory means when use of the program is input from the input means, the total pieces of information concerning the usage fees stored in the memory means are calculated by the calculation means, and the total usage fee obtained by the calculation means is displayed by the display means, the viewer can determine the total charge for pay-per-view programs he/she used during a specific period.

[0114]

According to the pay-broadcast transmission/reception device described in Claim 5, at the broadcast-supply side, the adder means adds the information concerning the usage fee for the program to the program, and the program is transmitted to the reception terminal by the transmission means. On the other hand, at the reception terminal, the program sent from the broadcast-supply side is received by the reception means, the information concerning the usage fee is extracted by the extraction means from the program received by the reception means, and the information concerning the usage fee extracted by the extraction means is displayed by the display means. Thus, the viewer can determine the charge for a pay-per-view program before he/she starts to watch the program.

[0115]

According to the pay-broadcast transmission/reception device described in Claim 6, at the broadcast-supply side, the information concerning the usage fee for the program is added to the program by the adder means, and the program is transmitted to the reception terminal by the transmission means. On the other hand, at the reception terminal, the program sent from the broadcast-supply side is received by the reception means, the information concerning the usage fee is extracted by the extraction means from the program received by the reception means, use of the program by the viewer is input by the input means, the information concerning the usage fee extracted by the extraction means is stored by the memory means when use of the program is input from the input means, the total of the usage fees stored in the memory means during a specific period is calculated by the calculation means, and the total usage fee obtained by the calculation means is displayed by the display means. Thus, the viewer can determine the total charge for the pay-per-view programs he/she used during the specific period.

Brief description of the figures

Figure 1 is a block diagram showing the configuration of an application example of the present invention.

Figure 2 is a diagram for explaining the principle of operations carried out by a reception terminal.

Figure 3 is a diagram showing program information sent from the broadcast-supply side.

Figure 4 is a diagram showing an example of program viewing history stored in a security module.

Figure 5 is a flow chart for explaining processing for obtaining the total charge incurred during a specific period out of the program viewing history.

Figure 6 is a diagram showing how the total charge is displayed on a display unit.

Figure 7 is a diagram showing program information sent from the broadcast-supply side.

Figure 8 is a diagram showing an example of program information sent from the broadcast-supply side.

Figure 9 is a flow chart for explaining processing for obtaining the total charge incurred during a specific period out of the program viewing history.

Figure 10 is a diagram showing how the total charge is displayed on the display unit.

Figure 11 is a diagram showing an example of viewing history stored in the security module.

Figure 12 is a flow chart for explaining processing for obtaining the total charge incurred during a specific period out of the program viewing history.

Figure 13 is a diagram showing how the total charge is displayed on the display unit.

Explanation of symbols

1 Encoder
2 Multiplexer (adder means)
3 Scrambler (transmission means)
4 Related information sending unit
5 Program control system
6 Scrambling control system
7 Viewing information collection processing system
21 Decoder (reception means)
22 Controller (calculation means)
23 Security module (memory means)
24 Input unit (input means)
25 Pay acknowledgement button
26 Impulse pay-per-view button
27 Charge amount display [sic] button
28 Display unit (display means)
31 Transmission channel
32 Telephone line

41 Descrambler
42 Second decoder (extraction means)
43 First decoder

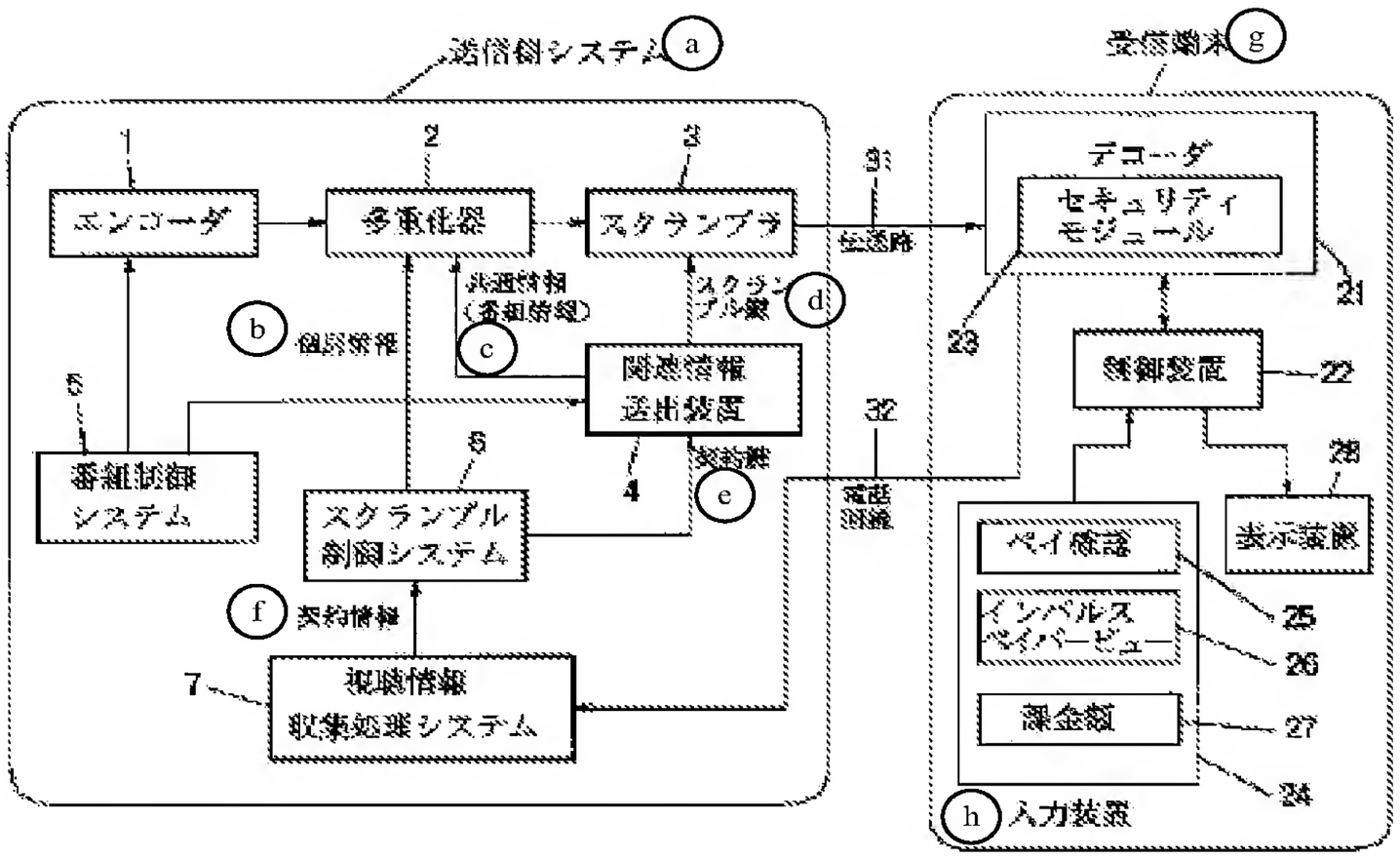


Figure 1

Key:
a Transmitting-side system
b Private information
c Common information (program information)
d Subscription information
e Scrambling key
f Subscription key
g Reception terminal
h Input unit
1 Encoder
2 Multiplexer
3 Scrambler
4 Related information sending unit
5 Program control system
6 Scrambling control system
7 Viewing information collection processing system
21 Decoder
22 Controller
23 Security module
25 Pay acknowledgement
26 Impulse pay-per-view
27 Charge amount
28 Display unit

31 Transmission channel
32 Telephone line

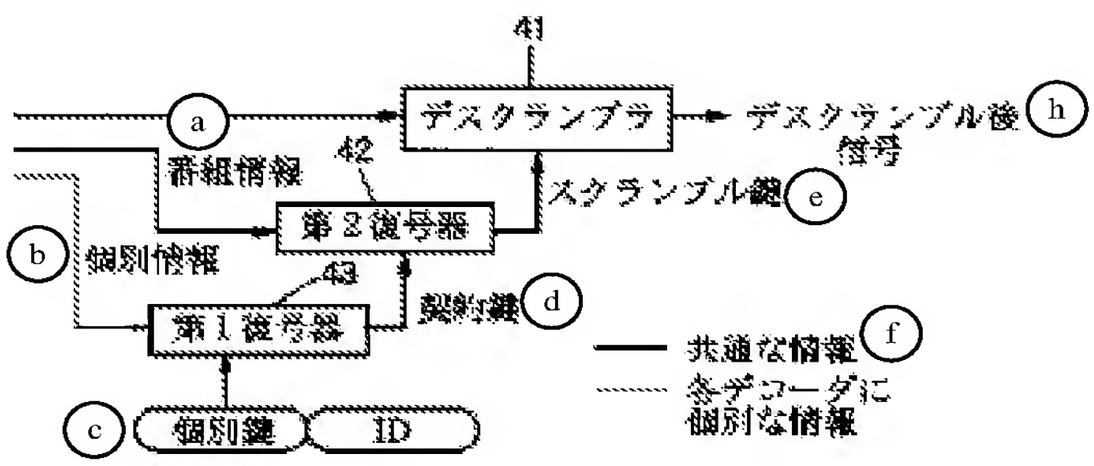


Figure 2

Key: a Program information
b Private information
c Private key
d Subscription key
e Descrambled signal
f Scrambling key
g Common information
h Information unique to each decoder
41 Descrambler
42 Second decoder
43 First decoder

Service_id	Event_id	Title	Charge

Figure 3

Service_id	Event_id	Title	Charge
1 A放送	0012	バイオリンリサイタル 4	¥1,000
2 B放送	0020	ワールドニュース 5	¥500
⋮	⋮	⋮	⋮
3 X放送	0051	映　画 6	¥600

Figure 4

Key: 1 Station A
2 Station B

3 Station K
4 Violin recital
5 World news
6 Movie

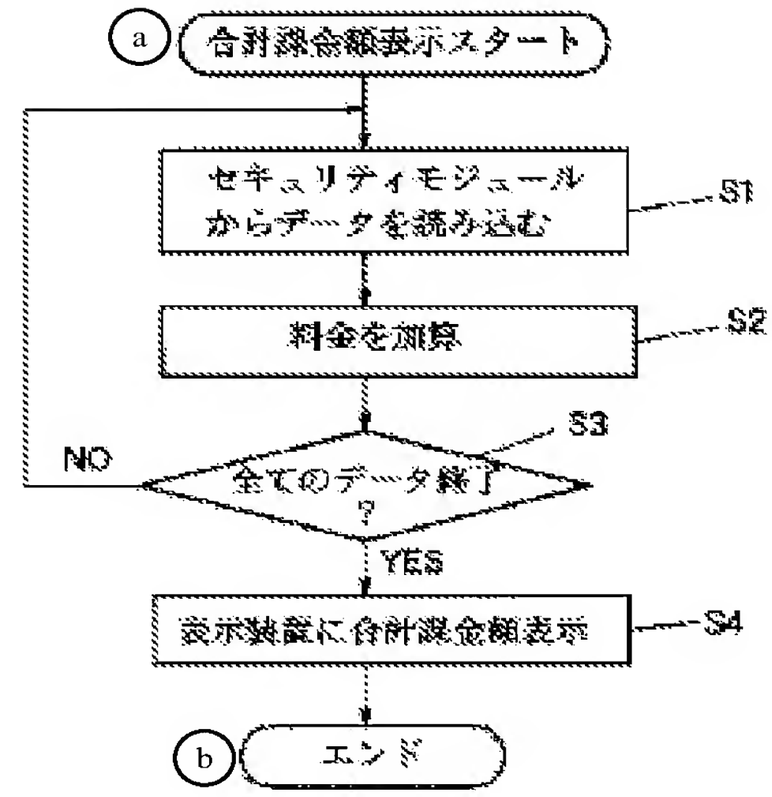


Figure 5

Key: a Start displaying the total charge
b End
S1 Read data from the security module
S2 Add a charge
S3 All data completed?
S4 Display the total charge on the display unit

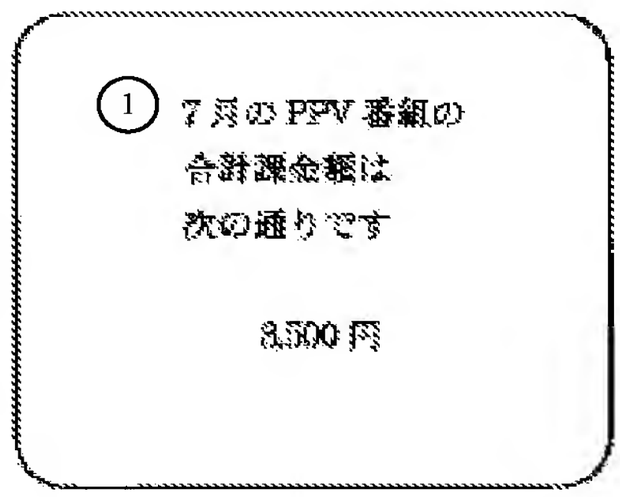


Figure 6

Key: 1 The total charge for PPV programs for July is shown below.
3,500 yen

Service_id	Event_id	Title	Component_tag	Charges

Figure 7

Service_id	Event_id	Title	Component_tag	Charges
(1) A放送	0012	(4) バイオリン リサイタル	動画1 (7)	¥1,000
			音声1 (8)	¥150
			データ1 (9)	……
(2) B放送	0020	(5) ワールドニュース	動画1 (7)	¥500
			音声1 (8)	¥200
			データ1 (9)	¥200
⋮	⋮	⋮	⋮	⋮
(3) K放送	0081	(6) バロックコンサート	動画1 (7)	¥800
			音声1 (8)	¥200
			データ1 (9)	——

Figure 8

Key:
1 Station A
2 Station B
3 Station K
4 Violin recital
5 World news
6 Baroque concert
7 Motion picture 1
8 Audio 1
9 Data 1

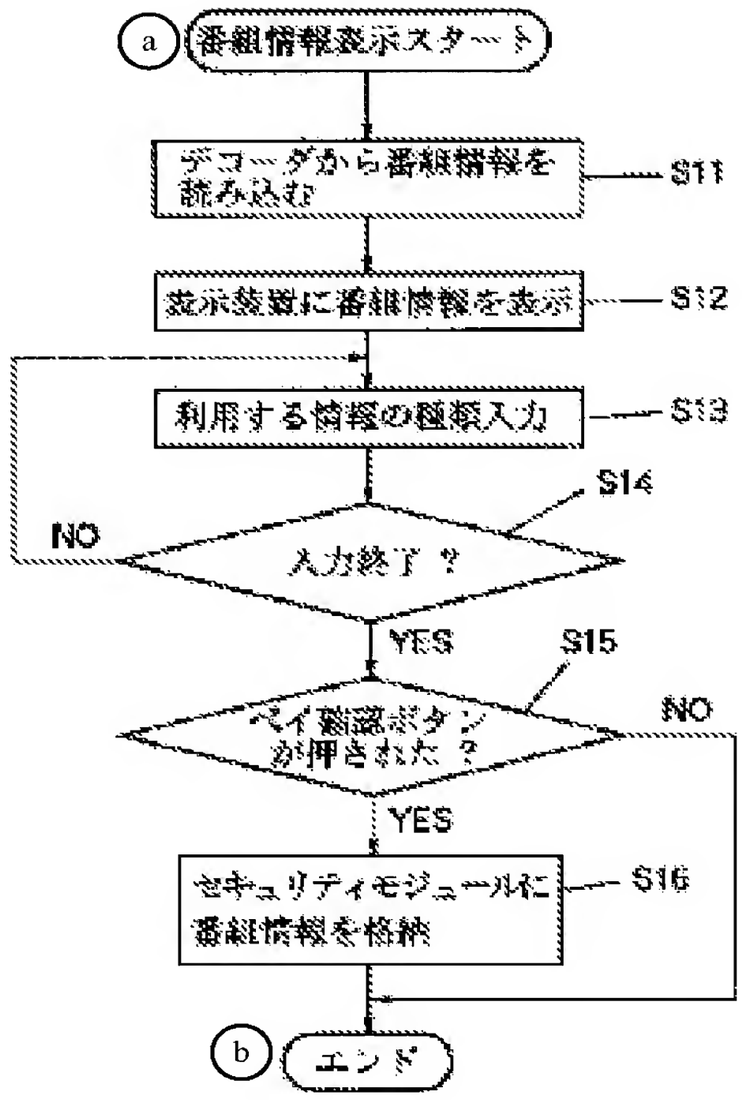


Figure 9

Key: a Start displaying the program information
b End
S11 Read the program information from the decoder
S12 Display the program information on the display unit
S13 Input an information type to be used
S14 Input completed?
S15 Pay acknowledgement button pressed?
S16 Store the program information in the security module

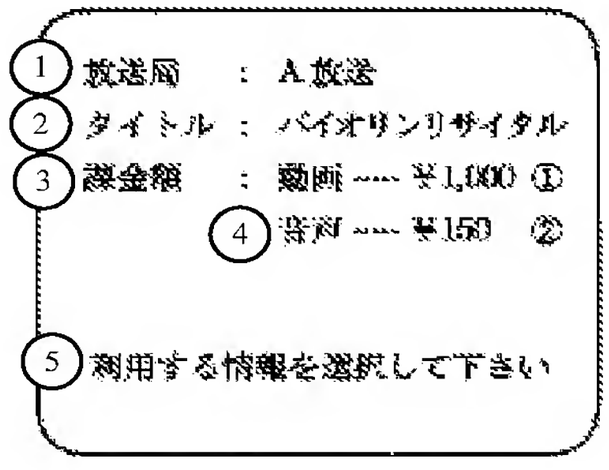


Figure 10

Key: 1 Broadcasting station: Station A
2 Title: Violin recital

3 Charges: Motion picture… ¥1,000 ←
4 Audio … ¥150 ↑
5 Please select the information to be used

Service_id	Event_id	Title	Component_tag	Charges
(1) B 放送	0020	(3) ワールドニュース	動 画 1 (5)	¥500
			音 声 1 (6)	¥300
			データ 0 (7)	——
……	……	……	……	……
(2) K 放送	0091	バロックコンサート (4)	動 画 0 (5)	——
			音 声 1 (6)	¥200
			データ 0 (7)	——

Figure 11

Key:
1 Station B
2 Station K
3 World news
4 Baroque concert
5 Motion picture __
6 Audio __
7 Data __

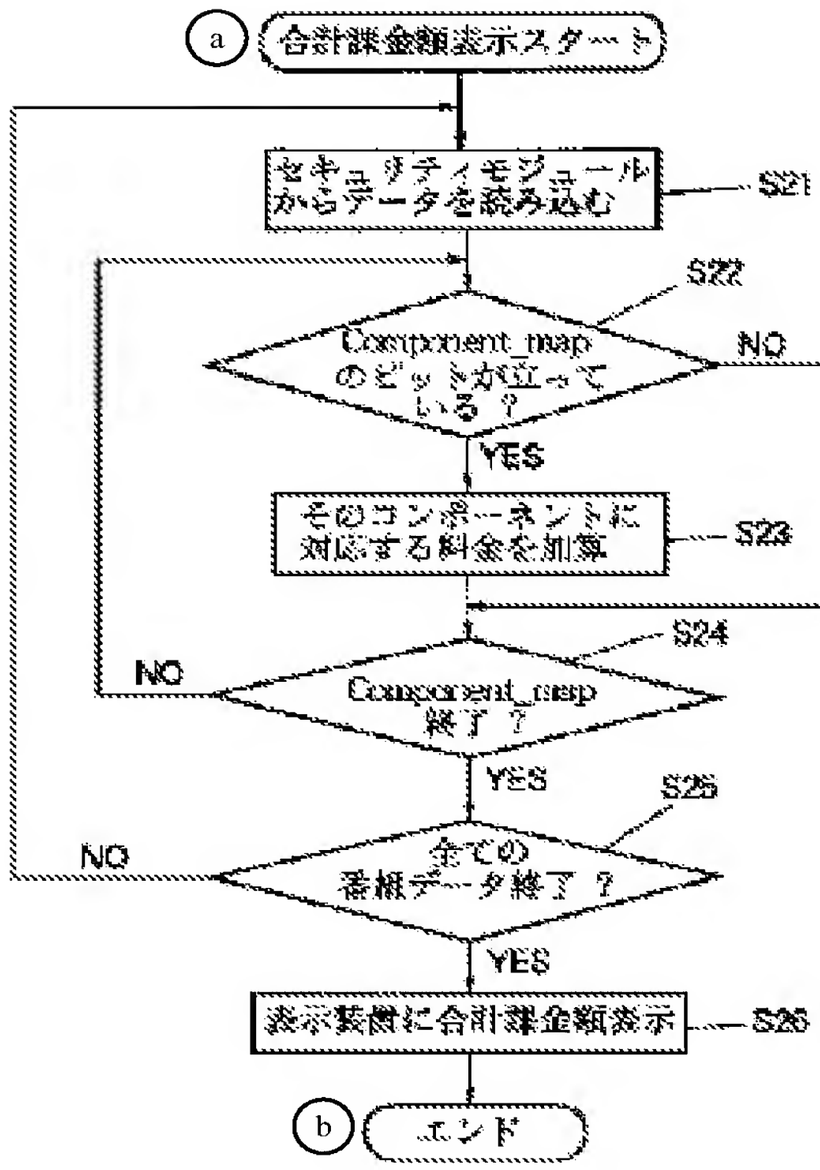


Figure 12

Key:
- a Start displaying the total charge
- b End
- S21 Read data from the security module
- S22 Bit in the Component_map is elevated?
- S23 Add the fee that corresponds to the component
- S24 Component_map completed?
- S25 All program data completed?
- S26 Display the total charge on the display unit

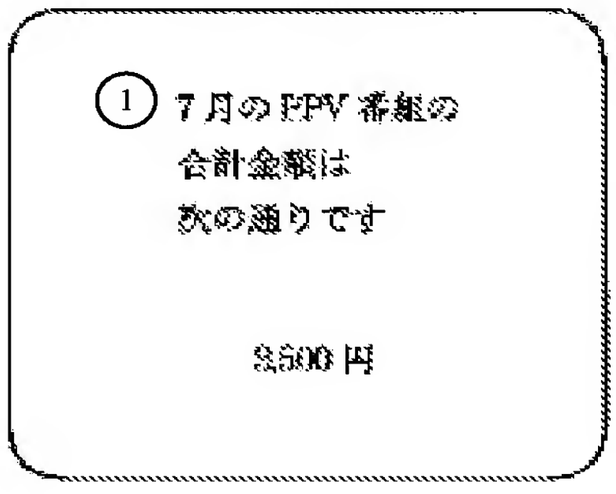


Figure 13

Key: 1 The total charge for PPV programs for July is shown below.
3,500 yen